



PATENT
Docket No. 146712002800
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Stephanie R. Mason
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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In the application of:

Qixu CHEN et al.

Serial No.: 10/022,728

Filing Date: December 20, 2001

For: RUTHENIUM-ALUMINUM
UNDERLAYER FOR MAGNETIC
RECORDING MEDIA

Examiner: K. Bernatz

Group Art Unit: 1773

APPEAL BRIEF

MS APPEAL BRIEF-PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is a timely appeal from the final rejection dated September 30, 2003.

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Seagate Technology LLC

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences within the meaning of 37 CFR 1.192(c)(2)

known to appellant or counsel.

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III. STATUS OF CLAIMS

Claims 1 and 3-19 (shown in Appendix 1), which are under final rejection, are the only pending claims in the application.

Claim Rejections - 35 USC 103:

(1) Claims 1, 3, 6 and 9-16 were rejected as being obvious over Bian in view of Okumura, Lal and “applicants’ admissions” as “evidenced by Wang” for motivation to combine the references applied to reject the claims. See Final Rejection/Action mailed September 30, 2003, page 2, last four lines.

(2) Claims 4, 7, 8, 17 and 19 were rejected as being obvious over Bian in view of Lal, Okumura and “applicant’s admissions” as applied above, and further in view of Chen (‘795) or Chen (‘923). Wang was applied as evidence for motivation to combine the teachings of the other references applied to reject the claims.

(3) Claims 5 and 18 were rejected as being obvious over Bian in view of Lal, Okumura and “applicant’s admissions” as applied above, and further in view of Chen (‘795) or Chen (‘923) as applied above, and further in view of Abarra. Wang was applied as evidence for motivation to combine the teachings of the other references applied to reject the claims.

IV. STATUS OF AMENDMENTS

An amendment after the Final Rejection was filed and will be entered for purposes of Appeal as per the Advisory Action of January 14, 2004.

V. SUMMARY OF THE INVENTION

The invention provides a magnetic recording medium for high areal recording density exhibiting a relatively high remanent coercivity, and/or a relatively high SMNR. One way of achieving this goal is to produce a magnetic recording medium with an underlayer that can affect

the microstructure of a subsequent underlayer and/or magnetic layer. The magnetic recording medium, includes a substrate, a B-2 structured ruthenium-aluminum-containing underlayer; and a magnetic layer comprising a Co(11.0) orientation [7:3-9].¹

In one embodiment, for example, layers were deposited on mechanically textured AlMg/NiP substrates, the surface of which was naturally oxidized. Underlayers, such as RuAl, and CrW, an intermediate layer, such as CoCr, a magnetic layer, such as CoCrPtB, and a carbon overcoat were sequentially deposited on the non-magnetic substrates. Magnetic properties, such as remanent coercivity (Hr), and Mrt (magnetic film thickness, t, times magnetic remanence, Mr) were measured with a Rotating Disk Magnetometer (RDM). Recording performances, such as signal to noise ratio (SMNR), overwrite (OW), and full width at half maximum of output signal (PW50), were measured on a spin stand, with a head consisting of a write element and a giant magnetoresistive (GMR) read element to characterize the magnetic recording medium [18-19-19:9].

As a result of this invention, Appellants found the *unexpected result* that a RuAl underlayer could produce an OR-Mrt of greater than 1.0 [21:3-13]. This unexpected results were not known to person of ordinary skill in this art prior to this invention and are even recited in the independent claims.

In addition, Appellants prepared Examples A and B, listed in Table II of the specification, having an identical magnetic layer, i.e., a CoCr₁₅Pt₁₂B₁₂ alloy, and an identical Mrt value. Sample A had film structure of Cr/CrW₁₀/CoCr₃₇/CoCr₁₅Pt₁₂B₁₂. Sample B had film structure of RuAl/CoCr₃₇/CoCr₁₅Pt₁₂B₁₂. Surprisingly, samples A and B had similar SMNR values in spite of the lower OR-Mrt value of sample B, i.e., the recording media with the RuAl

¹ “[7:3-9]” refers to page 7, lines 3-9, of the specification.

underlayer [21:3-13]. This result too was totally unexpected because persons of ordinary skill in this art would have expected a lower SMNR value for a lower OR-Mrt value.

VI. ISSUES ON APPEAL

(1) Whether the Examiner erred in rejecting claims 1, 3, 6 and 9-16 as being obvious over Bian in view of Okumura, Lal and “applicants’ admissions” as “evidenced by Wang.” See Final Rejection mailed September 30, 2003, page 2, last four lines.

(2) Whether the Examiner erred in rejecting claims 4, 7, 8, 17 and 19 as being obvious over Bian in view of Lal, Okumura and “applicant’s admissions” as applied above, and further in view of Chen (‘795) or Chen (‘923) in light of the “evidence” from Wang for motivation to combine the teachings of the other cited references.

(3) Whether the Examiner erred in rejecting claims 5 and 18 as being obvious over Bian in view of Lal, Okumura and “applicant’s admissions” as applied above, and further in view of Chen (‘795) or Chen (‘923) as applied above, and further in view of Abarra in light of the “evidence” from Wang for motivation to combine the teachings of the other cited references..

VII. GROUPING OF CLAIMS

All claims in this appeal stand or fall together.

VIII. ARGUMENT

(A) Wang is not prior art and cannot be applied as evidence of motivation to combine references.

During the telephone interview of January 28, 2004, the Examiner acknowledged to the undersigned that Wang was relied upon as evidence of motivation to combine the teachings of the other references applied to reject the claims because the Board has reversed obviousness rejections in cases where the Examiner did not provide evidence of motivation to combine

references. Pending claims 1 and 11 contain the limitation of original claim 2, which was rejected in the first Action mailed March 26, 2003, as being obvious over Bian in view of Lal, Okumura and applicants' admission. In the Amendment of June 26, 2003, Appellants challenged the Examiner to provide evidence showing a correlation between OR-Hc and OR-Mrt (see page 8, lines 14-16, of the Amendment of June 26, 2003). Subsequently, the Examiner issued the Final Rejection of September 30, 2003, in which claims 1 and 11 were rejected as being obvious over Bian in view of Okumura, Lal and applicants' admissions *as evidenced by Wang*. Also, the Examiner stated that "*Applicants' arguments have been considered but are moot in view of the new grounds of rejection.*" See Action of September 30, 2003, page 9, lines 10-11; emphasis added. The *only* difference between the grounds for rejection of original claim 2 as being obvious over Bian in view of Lal, Okumura and applicants' admission in the first Action of March 26, 2003, and pending claims 1 and 11 (which incorporate the limitation of original claim 2) as being obvious over Bian in view of Okumura, Lal and applicants' admissions *as evidenced by Wang* in the Final Action of September 30, 2003, is the following additional paragraph on page 3, lines 1-6, from the bottom, of the Final Action:

Furthermore, Wang et al. provides evidence that the orientation ratio is a measure of the relative orientation of the magnetic grains and their properties in the circumferential to radial directions (*Paragraphs 0003, 0007, 0022, and 0036*) and that the orientation ratio can be measured by comparing the relative magnitude of any of the magnetic properties, such as Hc Mrt or squareness (*Table 3.1-3.3*).

The above quoted paragraph relates *only* to Wang. By the Examiner's *own* admission, the rejection of pending claims 1 and 11 as being obvious over Bian in view of Lal, Okumura and applicants' admission is "moot in view of the new grounds of rejection." The new grounds

for rejection rely on Wang *for evidence of motivation to combine references*. See Action of September 30, 2003, page 9, lines 10-11.

Please note that the filing date of Wang is December 22, 2000, and the publication date is May 30, 2002, while the filing date of the pending application is December 20, 2001.

During the interview of January of 28, 2004, the undersigned explained to the Examiner that if the Examiner intended to apply Wang as a 102(e) prior art, then the Examiner should *explicitly* state so on the record. The Appellants would then have the option to antedate Wang. The Examiner explained, as stated in the Interview Summary mailed February 10, 2004, that Wang was *not* applied as a 102(e) prior art but instead as evidence of motivation to combine references.²

The undersigned argued that if Wang is merely an evidentiary reference, then it cannot be applied to support the obviousness rejection because the publication date of Wang is after the filing date of this application. Thus, the evidence from Wang relied upon by the Examiner to show motivation to combine references would not have been available to persons of ordinary skill in this art at the time of this invention. The Examiner disagreed and cited MPEP 2124 which states that “References which do not qualify as prior art because they post-date the claimed invention may be relied upon to show the level of ordinary skill in the art at or around the time the invention was made.” See Interview Summary mailed February 10, 2004. The Examiner further states in the Interview Summary mailed February 10, 2004, that “Wang et al. is relied upon in such a manner.”

² In particular, the Examiner relies on Wang for evidence that “the orientation ratio (OR) is known to be measured by comparing the relative magnitude of a variety of properties.” See Interview Summary mailed February 10, 2004.

In short, the pending obviousness rejection of claims 1 and 11 can *only* be sustained *if* Wang can be relied for providing evidence of motivation to combine references even though it is *not* applied by the Examiner as a 102(e) reference.

The Supreme Court in *Graham v. John Deere Co.*, 383 U.S. 1 (1966), stated that although “the ultimate question of patent validity is one of law ... the § 103 condition ... lends itself to several basic factual inquiries.” The Supreme Court in *Graham* explicitly stated that the factual inquiries are:

[1] the scope and content of the prior art are to be determined; [2] differences between the prior art and the claims at issue are to be ascertained; [3] and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. *Id.*

MPEP 2124 states that in making factual inquiry regarding the *third prong* of the *Graham* factual inquiries, “[r]eferences which do not qualify as prior art because they post-date the claimed invention may be relied upon to show the level of ordinary skill in the art at or around the time the invention was made.” As explained in MPEP 2141.03, the level of ordinary skill in the art relates to the determination of the “hypothetical person having ordinary skill in the art.” However, neither MPEP 2124 nor any law states that references which do not qualify as prior art because they post-date the claimed invention may be relied upon as evidence of motivation to combine references for a determination of a *prima facie* case of obviousness. On the contrary, the Federal Circuit in *Richardson-Vicks Inc. v. Upjohn Co.*, 122 F.3d 1476, 44 USPQ2d 1181 (Fed. Cir. 1997), has explicitly stated:

The obviousness of a patent claim is determined “at the time the invention was made.” 35 U.S.C. § 103. April 9, 1984 is the date the original patent application was filed [and the date of constructive reduction to practice of the invention as decided by the trial court]. ... Accordingly, the relevant prior art is that art

existing prior to April 9, 1984, the date of constructive reduction to practice of the invention.

Clearly, the Examiner has relied upon Wang to establish a *prima facie* case of obviousness, not just to show the level of ordinary skill in the pertinent art at the time of this invention. Yet, the Examiner cites a statement of MPEP 2124 that relates *only* to the level of ordinary skill in the art. In short, Wang cannot be relied upon in an evidentiary manner as has been relied by the Examiner and, therefore, the Examiner has failed to establish a *prima facie* case of obviousness.

(B) The Examiner's position of obviousness is simply a hypothesis without a reasonable expectation of success, and fails to make *express and correct* findings of the *Graham* factual inquiries in an ordered and systematic manner.

The Federal Circuit has emphasized the need for express findings of the *Graham* factual inquiries in an ordered and systematic manner. See *Specialty Composites v. Cabot Corp.*, 845 F.2d 981, 990 (Fed. Cir. 1988). One would recognize that if the answers to the *Graham* factual inquiries are incorrect, as has been the case in the pending application, then the answer to the ultimate question of obviousness would also be incorrect because *obviousness is a question of law based on underlying facts*. Appellants respectfully submit that the Examiner did not undertake the *Graham* factual inquiries in an ordered and systematic manner, which has thereby resulted in an incorrect conclusion by the Examiner that the pending claims are obvious over the cited references.

In the Final Action of September 30, 2003, under "Response to Arguments" in paragraph 7 of the Action, the Examiner states:

[A]pplicant(s) argue(s) that "the Examiner seems to have recognized, but has not explicitly stated, that Bian discloses an

isotropic media, not an oriented media". The examiner respectfully disagrees.

The Examiner notes that the reason the Examiner has not explicitly stated the above is because Bian et al. is not directed to an isotropic media, but an oriented in-plane/longitudinal medial ...

Subsequently, Appellants challenged the Examiner's position that Bian's media is an oriented media. See pages 5-7 of the Amendment of December 17, 2003. In light of Appellants' challenge, the Examiner then changed his position as to whether Bian's media is isotropic or oriented, and stated, "It is the Examiner's position that since Bian et al. does not explicitly mention that the medium is either oriented /or/ isotropic, that neither can be assumed." See Advisory Action of January 14, 2004.

The above statements of the Examiner speak for themselves about the degree of confusion in the Examiner's mind regarding Bian's media. According to the Examiner, a person of ordinary skill in this art would have selected Bian's media as the starting point to arrive at the claimed media. However, if the person did *not* even know what constitutes Bian's media, then how could the person arrive at the claimed media?

Simple logic dictates that to go from point A to point B, one *must* first have the definitions/locations of both point A and point B. Appellants respectfully submit that the Examiner is totally confused regarding Bian's media because the Examiner fails to understand what constitutes Bian's media. Yet, the Examiner has argued *without* providing underlying facts that it would have been obvious to a person of ordinary skill in this art to modify Bian's media to arrive at the claimed media. How could a person of ordinary skill in this art modify Bian's media to something else with any degree of a reasonable expectation of success if the person does not even understand what constitutes Bian's media? As explained in MPEP 2142, "there *must* be a reasonable expectation of success" (emphasis added) to establish a *prima facie* of

obviousness. “The prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success.” MPEP 2143.02; citation omitted.

Appellants respectfully submit that the Examiner’s position of obviousness is simply a hypothesis. Without a clear understanding of Bian’s media, persons of ordinary skill in this art would *not* find a reasonable expectation of success to modify Bian’s media and arrive at the claimed invention. Thus, the Examiner has failed to make *express and correct* findings of the *Graham* factual inquiries in an ordered and systematic manner.

(C) The Examiner’s stated motivation to combine Bian and Okumura begs the question of why persons of ordinary skill in this art would have been motivated to use the textured substrate of Okumura in the magnetic recording medium of Bian.

The Examiner recognizes that Bian *fails* to disclose the non-magnetic substrate being textured, nor an OR-Mrt of more than 1.05. See page 3, lines 7-8, of the Final Action of September 30, 2003. So, the Examiner resorts to Okumura to complete any case of obviousness. There is no evidence in either Bian or Okumura of a motivation for persons of ordinary skill in the art to have used a textured substrate disclosed in Okumura in the magnetic recording medium of Bian to produce the claimed magnetic recording medium. However, in an attempt to present “evidence” to support an essential element of the *prima facie* case of obviousness, that persons of ordinary skill in the art would have been motivated to combine Bian and Okumura, the Examiner relies on Lal and Wang and alleges that applicants’ provide “evidence” for motivation to combine the teachings of Bian and Okumura.

The Examiner’s stated motivation to combine Bian and Okumura is “to increase the Mrt ratio above 1.05, which results in an improved longitudinal recording medium having increased coercive force and improved S/N.” See Final Action of September 30, 2003, page 4, lines 3-5.

That argument begs the question of why persons of ordinary skill in this art would have been motivated to use the textured substrate of Okumura in the magnetic recording medium of Bian.

“The presence or absence of a motivation to combine references in an obviousness determination is a pure question of fact.” *In re Gartside*, 203 F.3d 1305, 53 USPQ2d 1769 (Fed. Cir. 2000). The Examiner has failed to provide any reasoned, *factual* basis for arguing that persons of ordinary skill in the art would have been motivated to modify the recording medium of Bian by substituting Bian’s non-textured substrate with Okumura’s textured substrate other than to argue that such a modification would be “desirable.” See Advisory Action of January 14, 2004. In short, the Examiner has merely set forth suppositions and speculations without providing any basis in *fact*. If the Examiner has substantive evidence, as opposed to mere personal opinion and supposition based on Lal, Wang and Appellents’ application, to support his speculation that a textured substrate in lieu of the non-textured substrate would improve the coercive force and S/N of the magnetic recording medium of *Bian*, not just any generic medium, then the Examiner should have presented it in the Action of September 30, 2003. If the Examiner is relying on personal knowledge to conclude the same, then the Examiner should have provided a declaration in accordance with 37 CFR 1.104(d)(2).

As persons of ordinary skill in this art would recognize, properties such as coercive and S/N of a magnetic layer depend on many factors including the chemical structures and compositions of the layers below the magnetic layer. Particularly, in light of the decision in *In re Zurko*, 258 F.3d 1379, 1385, 59 USPQ2d 1693, 1697 (Fed. Cir. 2001), MPEP 2144.03 specifically cautions examiners against taking official notice as the Examiner in this case has done:

It would not be appropriate for the examiner to take official notice of facts without citing a prior art reference where the facts

asserted to be well known are not capable of instant and unquestionable demonstration as being well-known. For example, assertions of technical facts in the areas of esoteric technology or specific knowledge of the prior art must always be supported by citation to some reference work recognized as standard in the pertinent art. [Underlining in original.]

(D) The Examiner’s evidence for “motivation as to why an oriented longitudinal medium is desirable” (see Advisory Action of January 14, 2004) is such a general motivation that it does not respond to the evidentiary burden which the Examiner must satisfy to make out a *prima facie* case of obviousness.

The Examiner’s alleged motivation to combine Bian and Okumura is such a general motivation that it does not respond to the evidentiary burden which the Examiner must satisfy to make out a *prima facie* case. The Examiner’s stated motivation to combine Bian and Okumura is “to increase the Mrt ratio above 1.05, which results in an improved longitudinal recording medium having increased coercive force and improved S/N.” See Final Action of September 30, 2003, page 4, lines 3-5. Such a motivation is so broad that it does not answer the central question of why, out of all the references disclosing textured substrates for magnetic media—and there are many of such references³ that would qualify as prior art—would a person of ordinary skill in the art choose Okumura as the disclosure to look to. The answer is apparent: Without Appellant’s disclosure and claims as a roadmap, *no* person of ordinary skill in this art would have chosen Okumura’s textured substrate for use in Bian media. This is classic, impermissible hindsight.

³ A search on the USPTO database using the search terms “textured substrate” and “magnetic recording medium” shows that there are *at least 50 U.S. patents* issued one year before the filing date of this application that disclose these search terms.

If “an oriented longitudinal medium is desirable” as alleged by the Examiner in the Advisory Action of January 14, 2004, and is sufficient motivation for someone to modify Bian’s media, then one should ask a simple question: Why did Bian itself not use a textured substrate if it was “desirable,” particularly because Okumura’s teachings were well known to persons of ordinary skill in this art at the time of the invention of Bian?⁴

The answer is apparent: The Examiner’s selected motivation is so general in the context of the relevant art that it constitutes no more than the reference to a general level of skill in the art found deficient in *In re Lee*, 277 F.3d, 1338, 61 USPQ2d 1430 (Fed. Cir. 2002). As emphasized by the court in *In re Lee*, 61 USPQ2d at 1433, the Examiner must present specific evidence of motivation, not the generalized evidence relied on in the final Action of September 30, 2003:

When patentability turns on the question of obviousness, the search for and analysis of the prior art includes evidence relevant to the finding of whether there is a teaching, motivation, or suggestion to select and combine the references relied on as evidence of obviousness. See, e.g., *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 1351-52, 60 USPQ2d 1001, 1008 (Fed. Cir. 2001) (“the central question is whether there is reason to combine [the] references,” a question of fact drawing on the *Graham* factors).

The burden imposed by *Lee* is not an impossible burden, as explained by the court in *In re Thrift*, 298 F.3d 1357, 1364-65, 63 USPQ2d 2002 (Fed. Cir. 2002), with respect to the references relied on by the Board in that case:

In the present case, the reasoning articulated by the Board is exactly the type of reasoning required by *In re Lee*. Both the examiner and the Board clearly identified a motivation to combine the references, stating that the skilled artisan would have “found it

⁴ Okumura was issued on January 2, 1996. Bian was filed on January 9, 2001, from a parent application filed February 9, 2000.

obvious to incorporate the speech input and speech recognition techniques taught by Schmandt into the expert system of Stefanopoulos in order to reduce the need for less user friendly manual keyboard and mouse click inputs.” Decision on Appeal at 5; accord Aug. 7, 1996 Office Action at 3. The motivation to combine the references is present in the text of each reference. The Schmandt reference itself verifies this motivation, stating that “allowing users to remain focused on the screen and keyboard, instead of fumbling for the mouse, would be beneficial in a workstation environment.” Schmandt at 51. Stefanopoulos itself, while not expressly disclosing the use of speech recognition, sets forth the motivation to combine the references, stating that “there are alternative means to select the buttons, including . . . voice-activated transfer means, which may be readily adapted for use with the present invention by those skilled in the art.” ’237 patent, col. 4, ll. 34-38.

The reliance in the Action of September 30, 2003, on the fact that there might be an improved coercive force and S/N comes nowhere close to the analysis required by *Lee* and approved in *Thrift*.

Based on *Lee* and *Thrift*, the appropriate question to ask again at this point in the analysis is: why, based on *Bian*, would a person of ordinary skill in the art have had any reason to look at Okumura and to use Okumura’s disclosure in conjunction with *Bian’s media*, not just any generic medium, to arrive at the claimed invention? There is only one reasonable answer: impermissible hindsight reliance on Appellant’s disclosure and claims as a roadmap to choose Okumura.⁵ This failure to present evidence of motivation requires that the rejection be withdrawn.

⁵ Appellants recognize that an Examiner cannot search prior art to use in examining a patent application without reading the application and its claims first. That much “hindsight” is permissible and expected in the examination process. However, that is as far as hindsight in the examination process can go. Once the Examiner finds prior art that appears to be relevant based on the limited amount of hindsight that is permissible, *Lee* and *Thrift* require the Examiner to point to *evidence* within the prior art references themselves as to why persons of ordinary skill in the art would have been motivated to combine the disclosures so as to arrive at the claimed invention. Appellants’ position rests on the Examiner’s failure to produce and rely on objective evidence of motivation in the prior art itself.

(E) The Examiner has acknowledged unexpected results, but did not find the unexpected results convincing for *totally faulty reasoning*.

In the Amendment of June 26, 2003, Appellants argued that even assuming that the Examiner has established a *prima facie* case of obviousness, which Appellants deny, the Federal Circuit in *In re Dillon*, 919 F.2d 688, 16 USPQ2d 1897 (Fed. Cir. 1990), *cert. denied*, 500 U.S. 904 (1991) clearly stated that Appellants could rebut a *prima facie* case of obviousness by a showing of *unexpected results*. As a result of this invention, Appellants found the *unexpected result* that a RuAl underlayer could produce an OR-Mrt of greater than 1.0 [21:3-13]. The unexpected results were not known to person of ordinary skill in this art prior to this invention. *The unexpected results are even recited in the claims*. Please note, “Consistent with the rule that all evidence of nonobviousness *must* be considered when assessing patentability, the PTO *must* consider comparative data in the specification in determining whether the claimed invention provides unexpected results.” *In re Soni*, 54 F.2d 746, 34 USPQ2d 1684 (Fed. Cir. 1995) (emphasis added).

In the Action of September 30, 2003, the Examiner states, “*The Examiner acknowledges applicants allegation of unexpected results*, but does not find them convincing” (emphasis added). See Action of September 30, 2003, page 10, lines 14-15. The Examiner’s reasons for finding the unexpected results “unconvincing” is that “the Examiner deems that one of ordinary skill in the art would have expected an Mrt OR greater than 1.05 given the texturing of the substrate/coating layer, regardless of the subsequently deposited layers since the crystals of the underlayers *must* grow along the textured surfaces.” See Action of September 30, 2003, page 10, line 19 to page 11, line 2; emphasis in the original.

Appellants respectfully submit that the Examiner's conclusion that it "would have [been] expected [to obtain] an Mrt OR greater than 1.05 given the texturing of the substrate/coating layer, regardless of the subsequently deposited layers since the crystals of the underlayers *must* grow along the textured surfaces" is *totally incorrect*. Texturing of the substrate/coating layer does *not* necessarily lead to Mrt OR to be greater than 1 as concluded by the Examiner. Please refer to the article entitled "Orientation ratio of sputtered thin-film disks," by M. Mirzamaani et al., J. Appl. Phys. **67**, 4695-4697, (1990), attached with the Amendment of December 17, 2003. On page 4695, right column, under "RESULTS AND DISCUSSION," Mirzamaani states:

The films prepared in sputter system B, on the other hand had in-plane magnetic isotropy ($OR = 1$) on both the textured and the etched substrates. These results clearly indicate that, in contrast with previously reported studies, the *substrate texturing alone does not necessarily lead to an $OR > 1$ in sputtered media*. [Emphasis added.]

In short, the Examiner's simplistic view that the substrate texturing alone *must* result in $OR > 1$ is *totally incorrect*. Appellants respectfully submit that the Board should acknowledge the unexpected results as has been acknowledged by the Examiner, but disregard the Examiner's faulty reasoning for not finding the unexpected results convincing.

CONCLUSION

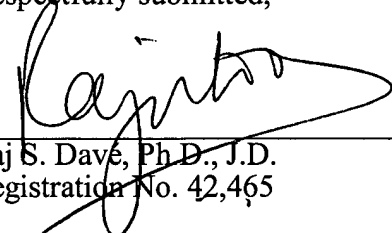
For the foregoing reasons, Appellants submit that the pending rejections should be reversed.

In the event that the transmittal letter is separated from this document and the Patent and Trademark Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to **Deposit Account No. 03-1952**, referencing docket number 146712002800. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

Respectfully submitted,

Dated: June 1, 2004

By:



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Appendix 1

1. A magnetic recording medium, comprising:
a non-magnetic substrate,
a B2-structured ruthenium-aluminum-containing underlayer comprising a (200) crystallographic orientation; and
a magnetic layer comprising a Co(11.0) crystallographic orientation, wherein the non-magnetic substrate is mechanically textured and OR-Mrt of the magnetic recording medium is more than about 1.05, thereby the magnetic recording medium is an oriented medium.
3. The magnetic recording medium of claim 1, wherein the ruthenium-aluminum-containing underlayer comprises RuAl and Ru is in a range from about 45 to about 51.5 atomic percent.
4. The magnetic recording medium of claim 1, further comprising an oxidized NiP film on the non-magnetic substrate, wherein the non-magnetic substrate is non-metallic.
5. The magnetic recording medium of claim 1, wherein the non-magnetic substrate is an Al-alloy substrate comprising electrolessly plated NiP, wherein the surface of the NiP film is oxidized.
6. The magnetic recording medium of claim 1, further comprising a chromium-containing second underlayer disposed between the ruthenium-aluminum-containing underlayer and the magnetic layer.

7. The magnetic recording medium of claim 4, wherein the oxidized NiP film comprises a phosphorus content in a range of about 12 to about 50 atomic percent and an oxygen content in a range of about 0.5 to about 50 atomic percent in the top 50Å of the oxidized NiP film.

8. The magnetic recording medium of claim 7, wherein the oxidized NiP film has a thickness of about 50-200,000Å.

9. The magnetic recording medium of claim 1, wherein the magnetic layer comprises an alloy material selected from the group consisting of CoCrPtB, CoCrPtBTa, CoCrPtBTaNb, CoCrPt, CoCrNi, CoCrPtTa, CoCrPtTa Nb, and CoCrTa.

10. The magnetic recording medium of claim 1, wherein the ruthenium-aluminum-containing underlayer has a thickness of about 50-800 Å.

11. A method of making a magnetic recording medium comprising:
providing a non-magnetic substrate;
depositing a B-2 structured ruthenium-aluminum-containing underlayer comprising a (200) crystallographic orientation on the non-magnetic substrate; and
depositing a magnetic layer comprising a Co(11.0) crystallographic orientation on the B-2 structured ruthenium-aluminum-containing underlayer, wherein the non-magnetic substrate is mechanically textured and OR-Mrt of the magnetic recording medium is more than about 1.05, thereby the magnetic recording medium is an oriented medium.

12. The method of claim 11, wherein the ruthenium-aluminum underlayer comprises from about 45 to about 51.5 atomic percent ruthenium.

13. The method of claim 11, further comprising depositing a chromium-containing second underlayer between the RuAl-containing underlayer and the magnetic layer.

14. The method of claim 11, further comprising depositing a CoCr-containing intermediate layer between the RuAl-containing underlayer and the magnetic layer

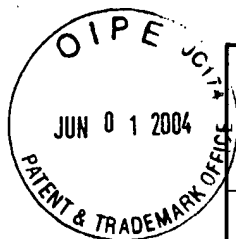
15. The method of claim 11, wherein the magnetic layer comprises an alloy material selected from the group consisting of CoCrPtB, CoCrPtBTa, CoCrPtBTaNb, CoCrPt, CoCrNi, CoCrPtTa, CoCrPtTa Nb, and CoCrTa.

16. The method of claim 11, wherein the ruthenium-aluminum-containing underlayer has a thickness of about 50Å to about 800Å.

17. The method of claim 11, further comprising sputter-depositing an oxidized NiP layer on the non-magnetic substrate.

18. The method of claim 11, further comprising electroless plating of the non-magnetic substrate with a NiP layer, then oxidizing and mechanical texturing the surface of the NiP layer, wherein the non-magnetic substrate is an Al-alloy substrate.

19. The method of claim 17, wherein the oxidized NiP layer comprises a phosphorous content of from about 12 at.% to about 50 at.%, and an oxygen content of from about 0.5 at.% to about 50 at.% in the top 50Å of the oxidized NiP layer.



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FEE TRANSMITTAL for FY 2004

Effective 10/01/2003, Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 330.00

Complete if Known

Application Number **10/022,728**
Filing Date **December 20, 2001**
First Named Inventor **Qixu CHEN**
Examiner Name **K. Bernatz**
Art Unit **1773**
Attorney Docket No. **146712002800**

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ Other ☐ None

☒ Deposit Account:

Deposit Account Number

03-1952

Deposit Account Name

Morrison & Foerster LLP

The Director is authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☒ Credit any overpayments

☐ Charge any additional fee(s) or any underpayment of fee(s)

☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1001	770	2001	385	Utility filing fee	
1002	340	2002	170	Design filing fee	
1003	530	2003	265	Plant filing fee	
1004	770	2004	385	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) (\$)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

		Extra Claims	Fee from below	Fee Paid
Total Claims	-20** =		x	0.00
Independent Claims	-3** =		x	0.00
Multiple Dependent				

Large Entity		Small Entity		Fee Description
Fee Code	Fee (\$)	Fee Code	Fee (\$)	
1202	18	2202	9	Claims in excess of 20
1201	86	2201	43	Independent claims in excess of 3
1203	290	2203	145	Multiple dependent claim, if not paid
1204	86	2204	43	** Reissue independent claims over original patent
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) (\$) 0.00

**or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for <i>ex parte</i> reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	420	2252	210	Extension for reply within second month	
1253	950	2253	475	Extension for reply within third month	
1254	1,480	2254	740	Extension for reply within fourth month	
1255	2,010	2255	1,005	Extension for reply within fifth month	
1401	330	2401	165	Notice of Appeal	
1402	330	2402	165	Filing a brief in support of an appeal	330
1403	290	2403	145	Request for oral hearing	
1451	1,510	1451	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,330	2501	665	Utility issue fee (or reissue)	
1502	480	2502	240	Design issue fee	
1503	640	2503	320	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	770	2809	385	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	770	2810	385	For each additional invention to be examined (37CFR 1.129(b))	
1801	770	2801	385	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify)

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$) 330.00

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Date

June 1, 2004